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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,585	09/30/2003	Shriram Ramanathan	42P17607	7967

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EXAMINER

NGUYEN, TUAN H

ART UNIT PAPER NUMBER

2813

DATE MAILED: 10/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/676,585

Applicant(s)

RAMANATHAN ET AL.

Examiner

Tuan H. Nguyen

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-18 is/are pending in the application.
- 4a) Of the above claim(s) 27 and 28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Election/Restrictions

Newly submitted claims 27-28 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 27-28 direct to a method of using the wafer or die assembly by selectively turned on and off the at least thermoelectric film by a power controller, not a wafer assembly.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 27-28 have withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 11, 12, 15-21, 25-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Macris (US 2002/0063330).

See Macris, figs. 1-20 and related text, particularly figs. 8A-8C which show the claimed wafer assembly comprising a bare wafer 56 having at least a thermoelectric film 28 fabricated thereon (fig. 8B, and paragraph [0113]); an active wafer 60 having at least an active device 62 (fig. 8A, and paragraph [0112]) bonded to the bare wafer 28 by the backside, the active wafer 60 (fig. 8C, paragraph [0113]); wherein at least thermoelectric film 28 is located at a location matched to an area on the active wafer, (active device 62) that needs thermal control (fig. 8C).

With respect to claims 15-18, 25, 26, fig. 8C shows the thin active wafer 58 is bonded to the bare wafer 56 through an interlayer 64 in alignment, and the thermoelectric film 28 having heat absorbing junction 30 and heat rejecting junction 32 is fabricated at location corresponding to a localized hot spot on the active wafer to maximize heat spreading (paragraph [0082]).

With respect to claim 12, see paragraph [0079].

With respect to claim 19, see paragraph [0117].

With respect to claim 20 see fig. 1, wherein the bare wafer 28 has power signal 22 to control the at least thermoelectric film (paragraph [0077]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13-14, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Macris in view of Cordes et al..

See Macris, figs. 1-20 and related text in paragraphs [0042]-[0156] discloses substantially the claimed wafer assembly as explained above, except the claimed material for forming thermoelectric film.

Cordes et al., in a related art as shown in figs. 2C and text on col. 6, lines 5-11 teaches the use of a desired of composition of Bi, Sb, Te for forming thermoelectric element.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have use any suitable thermoelectric material such as an alloy comprising at least one of Bi, Te, Sb, Pb, Si, Ge as suggested by Cordes et al. for forming thermoelectric film in Macris since they are well-known material, and the substitution of art recognized equivalence as shown by Cordes et al. is within the level of those skill in the art.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Response to Arguments

Applicant's arguments filed 7/29/05 have been fully considered but they are not persuasive.

Since Macris as explained above, clearly teaches the claimed invention, including an active wafer 58 bonded to the bare wafer 56 by the backside, the bare wafer 56 having at least a thermoelectric film 28 formed thereon, and the active wafer having at least an active device in active circuitry layer 62 (paragraph [0012]) wherein the at least thermoelectric film 28 is located at a location matched to an area on the

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active wafer 58 that needs thermal control (Note that "match to an area on the active wafer that needs thermal control" as claimed is broad enough to include any active area that is contacted by thermoelectric film 28 for thermal control). Note also in fig. 8C that the thermoelectric film 28 is located right under the location of the active circuitry layer 62 with active devices formed therein that need thermal control.

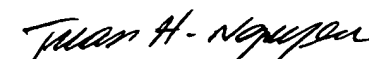
Contrary to the applicant's argument with respect to the rejection under 35 U.S.C. 103 in his Remark, page 8, first paragraph that Macris and Cordes, taken alone or in any combination, do not disclose, suggest, or render obvious the claimed invention, and there is no motivation to combine Macris and Cordes because neither of them addresses the problem of integrating thermoelectric elements into wafer at locations that needs heat extraction. In fact, Macris discloses substantially the claimed wafer assembly with the use of thermoelectric element 28 located at a location underneath a heat source region from an active device (fig. 8C, layer 62) for removing heat. Macris fails to teach the use of material such as an alloy comprising at least one of Bi, Te, Sb, Pb, Si, Ge; however, in paragraph [0079], Macris clearly suggests the use of material for forming thermal element but not limited to silicon, carbon, silicon carbide, gallium arsenide or electrically conductive polymers. Cordes et al., in a related art, as shown in figs. 2C and text on col. 6, lines 5-11 teaches the use of a desired composition of Bi, Sb, Te for forming thermoelectric element. It would have been obvious to those skilled in the art to use the well-known material for forming the thermoelectric element in Macris since the substitution of art recognized equivalence is within the level of those skilled in the art.

With respect to the argument on page 8, second paragraph, last two lines that Cordes use a pulsed electrochemical deposition process to form the thermoelectric elements, not using bonding two wafers. The rejection does not overcome by pointing out that one reference does not contain a particular teaching when the reliance for that teaching was on another reference (In Re Lyons 150 USPQ 741). In this case, Macris clearly teaches the bonding two wafer for forming the thermoelectric element.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is 571-272-1694. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Tuan H. Nguyen
Primary Examiner